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IN THE

Supreme Court of the United States

OCTOBER TERM, 1971

No. 71-485

ROBERT GOTTSCHALK, COMMISSIONER OF PATENTS,
Petitioner,

v.

GARY R. BENSON AND ARTHUR C. TABBOT,
Respondents.

On Writ of Certiorari to the
United States Court of Customs and Patent Appeals

BRIEF FOR AMICUS CURIAE INTERNATIONAL BUSINESS MACHINES CORPORATION

QUESTION PRESENTED

Whether a novel method of arithmetical calculation that normally, but not necessarily, is performed by a computer is a patentable process.

INTEREST OF AMICUS CURIAE

International Business Machines Corporation (IBM) has received consent from both parties to file this brief

amicus curiae. The letters of consent have been filed with the Clerk of the Court.

IBM is a corporation organized under the laws of the State of New York. IBM's business involves the development, manufacture, and marketing of a wide range of electronic data processing equipment; the development and marketing of computer programs; the manufacture and marketing of office equipment such as typewriters, dictating equipment, and copying equipment; and the provision of various associated services.

The development and availability of innovative computer programming is of particular importance to a computer manufacturer because it increases the utilization of computers. Research in the use of mathematical or computational techniques is also of great importance to computer manufacturers because many significant uses of computers, for example in the study of atomic physics and in space exploration, derive from breakthroughs in mathematics that most practically can be performed only with the aid of a computer. An interpretation of the patent statute that permitted patent protection to extend to mathematical or computational techniques would have the inevitable effect not only of stifling developments in computer programming, but of slowing developments in fields dependent upon computer programming as well.[1]

The interest of amicus curiae is to deal with four aspects of the question presented in this case that are of particular importance: first, the practical restrictive effect of issuing patents on computer programs; second, the reasons why computer programs do not fit the statutory standard with respect to the patentability of a

[1] IBM has no interest in the patent that would be issued to respondents Benson and Tabbot because that patent would be owned by Bell Telephone Laboratories and IBM would be licensed under any such patent pursuant to the terms of an existing license agreement between Western Electric Company and IBM.

process; third, the decisions made in other countries with respect to whether computer programs are patentable; and fourth, the availability of other and more appropriate protection for the proprietary interest in computer programs through copyright.

SUMMARY OF ARGUMENT

Patents issued on computer programs will extend patent protection far beyond any current limits and will inevitably permit the patenting of mathematical techniques, scientific principles and other abstract concepts or rules. A computer program is simply a mode of expressing ideas. The logical solution to a problem may appear as a writing in a book, or in mathematical notation form, or in a form of machine language that can be utilized by a computer. However, the essence is the same. The invention or discovery contained in a computer program must reside in the principle, rule or mathematical technique that is expressed and therefore the program is not patentable subject matter.

Further, in carrying out the instructions in a computer program the computer itself operates entirely as it was designed and built to operate. The only contribution of the program is to set out a specific sequence of steps for the computer to perform. The performance of each of the individual steps is a capability fully intended and contemplated by the designer of the computer and varying the sequence in which these steps are performed does not vary the actual nature of the operation of the computer so as to constitute a patentable invention.

Other countries where there has been a rapid increase in the development and utilization of computer technology have also faced this question. In nearly every such country the decision has been against extending patent protection to computer programs.

Finally, the copyright statute provides one appropriate form of protection for the proprietary interests in computer programs, and other forms of protection specially tailored for computer programs are presently under consideration.

ARGUMENT

Introduction

This is a landmark case in the history of the American patent system. It has been nearly 100 years since this Court fashioned the basic standard governing the patentability of a process. *Cochrane* v. *Deener*, 94 U.S. (4 Otto) 780 (1877). That standard proved entirely serviceable, and during the succeeding years only seven cases involving the question of what constitutes a patentable process reached this Court.[8]

However, the development and enormous growth of an entirely new technology in general purpose digital computers and computer programming has produced a new, and, for the court below, an irresistable pressure on the standard enunciated in *Cochrane* and its progeny. This new technology is unlike any that have come before. Other revolutionary technological developments essentially have subetituted for and greatly extended man's physical capabilities. The new mechanical, chemical and electrical processes that were devised to achieve physical results could readily be perceived and defined within the existing standards of the patent system. But the developments achieved in the computer field, particularly in computer programming, have subetituted for and greatly extended man's

[8] *Tilghman* v. *Proctor*, 102 U.S. (12 Otto) 707 (1881); *New Process Fermentation Co.* v. *Maus*, 122 U.S. 413 (1887); *The Telephone Cases*, 126 U.S. 1 (1888); *Risdon Iron & Locomotive Works* v. *Medart*, 158 U.S. 68 (1895); *Westinghous* v. *Boyden Power Brake Co.*, 170 U.S. 537 (1898); *Expanded Metal Co.* v. *Bradford*, 214 U.S. 366 (1909); *Funk Brothers Seed Co.* v. *Kalo Inoculant Co.*, 333 U.S. 127 (1948).

mental capabilities in organizing known information and in solving mathematical problems. Computer programming developments present, therefore, the basic question whether a new method for organizing information or for solving a mathematical problem may be patented as a process merely because the method can be performed by a computer.

The court below chose to meet this challenge by abandoning instead of interpreting and applying the principles declared by this Court in its prior decisions. The Patent Office rejected the Benson and Tabbot patent application because the process described was simply a method of manipulating mathematical symbols. Record at 140. The court below reversed, declaring the standard of patentability used by the Patent Office was inapplicable and no longer the law. *Application of Benson*, 441 F.2d 682 (C.C.P.A. 1971). *See also Application of Prater*, 415 F.2d 1393 (C.C.P.A. 1969); *Application of Bernhart*, 417 F.2d 1395 (C.C.P.A. 1969); *Application of Mahony*, 421 F.2d 742 (C.C.P.A. 1970); *Application of Musgrave*, 431 F.2d 882 (C.C.P.A. 1970); *Application of Foster*, 438 F.2d 1011 (C.C.P.A. 1971); *Application of McIlroy*, 442 F.2d 1397 (C.C.P.A. 1971); *Application of Waldbaum*, 173 U.S.P.Q. 430 (decided April 20, 1972). The consistent departure, in this line of cases, from the standard declared by this Court to be applicable to all process patent claims is unsupported either by the law or the facts.

In Part I of this brief we seek to focus on the practical effect of patents issued on computer programs. Part II reviews the development, through case law of this and other courts, of a standard to be met by patents issued on processes and analyzes the reasons why this standard should be applied undiminished to the field of computer programming. Part III summarizes the experience of other countries in dealing with the question whether computer programs are patentable. Part IV

analyzes the protection available for proprietary rights in computer programs through copyright and the present legislative proposals for specially tailored protection for proprietary rights in computer programs.

I. PATENTS ISSUED ON METHODS FOR PROGRAMMING COMPUTERS WOULD INEVITABLY CONSTITUTE BARRIERS TO THE DEVELOPMENT AND USAGE OF MATHEMATICAL AND SCIENTIFIC PRINCIPLES.

A. Respondents' Discovery Is a Method for Programming a Computer.

What the respondents have sought to patent is a computer program. It was so described by the Patent Examiner,[3] the Patent Office Board of Appeals,[4] and the court below,[5] and would be so described as a practical matter by anyone versed in the computer field.[6]

A computer program is most simply defined as "a series of instructions or statements, in a form acceptable to a computer, prepared in order to achieve a certain result."[7] The Benson and Tabbot patent application itself described the invention in just such terms:

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[3] Record at 18.

[4] Record at 140-141.

[5] *Application of Benson*, 441 F.2d 682, 683 (C.C.P.A. 1971).

[6] *See e.g.*, trade press reports on this case: *Software Patent Case Going to Supreme Court*, 17 DATAMATION 54 (November 1, 1971); Spaeth, *High Court Seen Likely to Reject Patents*, Computerworld, December 8, 1971, at 1, 6; *Patents on Computer Programs An Open Issue*, Weekly Report to the Electronic Industries, April 26, 1971, at 1; *Program Patents to High Court*, Computerworld, August 25, 1971, at 6; *Software Patent Faces Jeopardy*, Computerworld, October 13, 1971, at 9.

[7] American National Standards Institute, American National Standard Vocabulary for Information Processing at 30 (February 1970). Other definitions formulated include these essential elements. *See e.g.*, Comment, *Computer Program Protection: The*

"This invention relates to the processing of data by program and more particularly to the programmed conversion of numerical information. A program is a set of instructions for processing data in a preassigned fashion." [8] Record at 3.

The respondents' claims do not describe a particular make or model of computer with which their discovery must be used. Nor do they describe any new and unobvious machinery to be added to or used in conjunction with a particular computer. They merely recite a series of the conventional operations that can be performed by any general purpose digital computer in carrying out the steps that constitute their alleged discovery. The invention at issue is not the computer, nor any part of the computer. The invention is merely a plan, method or series of steps set out for resolution of a particular problem, which can be executed using the available capabilities of an existing computer. In other words, the invention is a computer program.

The respondents' discovery can more precisely be described as a mathematical algorithm that may be em-

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Need to Legislate a Solution, 54 CORNELL L. REV. 586 (1969); Bender, *Computer Programs: Should They Be Patentable*, 68 COLUM. L. REV. 241 (1968); Note, *Computer Programs and Proposed Revisions of the Patent and Copyright Laws*, 81 HARV. L. REV. 1541 (1968); Note, *Process Patents for Computer Programs*, 56 CALIF. L. REV. 466 (1968).

[8] The letters and numbers with which respondents set out their instructions, *e.g.*, STC 4; CGT, ADR x DR (see Record at 9), are in a form acceptable to a computer. This is a way of using letters and numbers to represent the arrays of ones and zeroes to which the computer responds. These instructions are written by the programmer and punched onto cards by a keypunch operator. Then the instructions on the cards are translated automatically into "machine language" by an assembler. Actual machine language is an array of ones and zeroes which correspond to the presence or absence of electrical signals in the machine. The number one represents an electrical pulse and the number zero represents no electrical pulse.

bodied in a computer program. An algorithm is the general plan or set of rules for the solution of a problem and may or may not be written in a form immediately acceptable to a computer. It is generally closer to plain English than to machine language. The term algorithm is preferred by some writers because of its apparent ease of definition.[9] However, what is at issue in this case is the whole spectrum of writings or things that are part of computer programming and the issue of patentability *vel non* is the same with respect to all of them—whether written in plain English or in a series of 1's and 0's. Therefore, the more general term computer program is used herein.

All computer programs are based upon some mathematical technique, logical procedure, or algorithm and contain a series of detailed instructions for carrying out this mathematical technique or algorithm. Devising a new mathematical principle or algorithm for use in a program can involve a high level of expertise, creativity and judgment. After the mathematical technique or algorithm has been developed, someone must write or set out the specific series of instructions that will cause the computer to follow the desired algorithm. This second part of the task is generally termed coding. During this procedure a programmer takes a certain limited number of operations that can be performed by a machine and he chooses and arranges this limited number of operations in a sequence so that the desired problem may be solved. Writing this series of machine instructions does not involve any significant creativity. *See* H. Goldstine and J. Von Neumann, *Planning and Coding of Problems for an Electronic Computing Instrument*, 5 COLLECTED WORKS OF JOHN VON NEUMANN 80 (A. Taub ed. 1968).

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[9] *See e.g.*, Breyer, *The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs*, 84 HARV. L. REV. 281, 341 (1970).

Respondents' computer program directs the computer in accordance with a mathematical technique for converting numbers of one type into numbers of another type. There are various ways that numbers can be represented. The numbers that we normally utilize are structured around the base number "ten". The biquinary numbering system used by the Chinese and Japanese is structured around the base numbers "two" and "five". The numbering system that the ancient Babylonians used is structured around the base number "sixty".[10] Digital computers generally operate upon numbers in the binary or base "two" numbering systems or in some related numbering system such as the binary coded decimal (BCD) system. These same computers can be made to operate on numbers in almost any of the other numbering systems; however, they may be less efficient when operating on numbers expressed in a form other than that which they were primarily designed to utilize.

Any number can be represented in any one of the various numbering systems that have been devised, and a variety of rules, principles or algorithms to convert from one numbering system to another numbering system have been developed by mathematicians through the ages. These rules, principles or algorithms are generally described in terms of execution by hand with pencil and paper or with the aid of a computation device such as a slide rule or desk calculator. They are found in many standard mathematics textbooks.[11]

The respondents' patent application describes one way of converting numbers from the binary coded deci-

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[10] A. AABOE, EPISODES FROM THE EARLY HISTORY OF MATHEMATICS (1964).

[11] *E.g.*, M. ROSSKOPF, MODERN MATHEMATICS FOR JUNIOR HIGH SCHOOLS, Book I, p. 35 (1961) (conversion of decimal numbers into binary numbers); H. JACOBOWITZ, COMPUTER ARITHMETIC 62 (1962) (conversion of binary numbers into ternary, octal and hexadecimal numbers); A. BAKST, MATHEMATICAL PUZZLES AND PASTIMES 56-69 (1954) (conversion of Roman numerals into decimal and biquinary numbers).

mal system to the binary system. The rule, principle or algorithm involved is the repeated addition of the binary digits 101 at certain specified points.[12] As described in respondents' patent application, this rule, principle or algorithm is executed by a computer through a specified computer program.[13]

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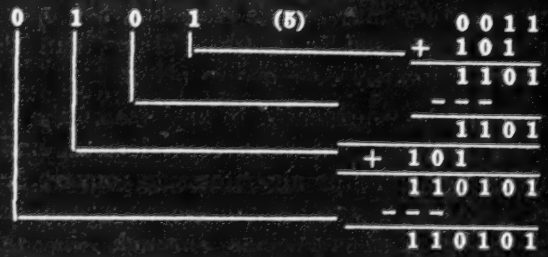
[12] Under the binary coded decimal system the number 58 would be represented by two binary numbers, one for each digit—0101 representing 5 and 0011 representing 8. This representation can be converted to the binary system representation of the number 58, which is 110101, by adding the binary digits 101 in successive positions each time the digit 1 appears in the higher order positions. The principle involved is most simply set out by respondents' description of the execution of the principle by hand, Record at 23:

"The example used in the specification can be done by hand as follows:



[13] The actual sequence of instructions performed by a computer in order to carry out the above algorithm is set out by respondents as follows (Record at 9-11):

Address	Instruction	Comment (extracted from text)
108	STC 4	store the "index" number 4
109	CGT ADR x DR	transfer the number to be converted from storage to a working location
110	SHR 3	shift number right 3 places
111	2BT 114	test second bit of number
112	SHR 1	shift number right 1 place
113	TRA 119	transfer
114	SSB 0	set second bit to 0
115	AD1 DR	add "1"
116	SHL 2	shift left
117	AD1 DR	increment by "1"
118	SHR 3	shift right
119	TIX 111	decrease the index number
120	SHR 1	shift right

In the court below, respondents stated that they had "*discovered that a very simple relationship exists* between the digits of the BCD number to be converted and the equivalent binary number when the conversion process is broken down into its most elementary steps. In addition, this relationship is identical for all BCD digits. Hence simple repetitive action can be used to accomplish the entire conversion." [14] (Emphasis added.)

Once respondents found or recognized the particular mathematical relationship between binary numbers and binary coded decimal numbers, the writing of a computer program to carry out the conversion using that relationship was elementary indeed. It required relatively few steps and could have been written by any skilled programmer. Further, the program could have been written for and utilized by almost any make or model of general purpose digital computer.

B. Patents Issued on Computer Programs Will Extend Patent Protection to Mathematical Techniques, Scientific Principles and Other Abstract Concepts or Rules.

Respondents' discovery is a simple but precise illustration of how and why patents issued on computer programs will have the general effect of extending patent protection to mathematical techniques, scientific principles and other abstract concepts or rules. It therefore presents squarely the question whether this is a desirable, intended, or even permissible result under the patent system.

The computer is an incomparable tool of exploration. So many possibilities and combinations may be explored in such a short time that the truly creative person can exercise his mind more freely than ever before and the

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[14] Brief for Appellants before the Court of Customs and Patent Appeals, at 7-8. This brief has been attached to the Record but is not numbered consecutively with the Record.

less gifted person can, by trial and error, be more innovative than ever before. It is an almost completely flexible tool. The solution to any problem that requires sifting and sorting of information or making of computations and calculations can be described in a computer program. Mathematical and scientific problems are particularly susceptible to solution by use of a computer directed by the necessary computer program.

Many mathematical breakthroughs can be practiced effectively only with the aid of a computer operating in accordance with a computer program, and most of these have no readily available alternatives. Mathematical discoveries of any importance are generally very difficult to "invent around." Nearly any subsequent method designed to achieve the same results would be mathematically equivalent to or obvious from the disclosure made with the initial discovery. Further, the computer is an essential tool to many specialists in mathematics and the sciences. For much of the current work being done in these fields, computation by hand with pencil and paper or mechanical calculators is, as a practical matter, impossible because of the enormous number of calculations to be made and the vast amount of time that would be required with any method other than a computer. If computer programs by which the breakthroughs are achieved could be patented, no one else would be able to make use of the discovery, whether for teaching, research, or commercial application, without permission from the patent owner." Further, most authors of computer programs involving

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[a] For example, respondents' claim 13 is not related to any particular practical use of the mathematics it describes. If issued as a patent it would allow respondents to extract a royalty from anyone using the defined conversion principle for seventeen years. The only practical application which the respondents' patent application discloses is to "program" a computer to make BCD-to-binary conversions in the manner specified. But the patent claim would prevent the use of the mathematical conversion principle in any other apparatus or method and even in hand calculation. Since the

new mathematical techniques would be compelled to make a patent search before running the program on any machine in order to avoid inadvertently incurring infringement liability.

A few examples of significant mathematical discoveries that are inextricably related to computer programming are set out below. These examples demonstrate first, that the major advances or breakthroughs that have been made in programming technology are fundamentally advances in mathematics; second, that a free exchange and wide dissemination of information has long characterized the field; third, that great efforts are now expended to develop relatively minor but helpful and important improvements on discoveries in the field because the benefits of both the discovery and the improvements are available, without limitation, to all who are interested; and fourth, that patents on mathematical techniques that are embodied in computer programs would constitute enormous blocks to progress in the field.

(1) In 1922, Lewis Fry Richardson developed a set of equations that could analyze a given set of atmospheric conditions and predict weather conditions twenty-four hours in advance.[16] The practical difficulty involved in using the Richardson equations was that, at the time, no one could solve the equations within a twenty-four hour period and, hence, there was no way that they could in fact be used to predict weather. Using the digital computer, these equations can be solved in a very short time and thus they can be, and in fact are, used to predict weather.[17]

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principle may be practiced by means of a written representation, it would appear that even the practice of the algorithm in the written directions in a book or article would infringe claim 13.

[16] L. Richardson, Weather Prediction by Numerical Process (Dover ed. 1965).

[17] Charney, Fjortoft, & Von Neumann, *Numerical Integration of the Barotropic Vorticity Equation*, 6 Collected Works of John Von Neumann 413 (A. Taub ed. 1963).

The digital computer is thus a tool which made practical the utilization of this mathematical discovery. However, the basic mathematical advance was made totally independent from, and long before, the development of the computer and is thus clearly independent of the computer.

Similarly, the use of a computer to obtain improved solutions for well known equations is one of the advances in technology which has made the space program possible. The basic equations used to predict orbits for satellites were developed in the 17th century from Newton's Fundamental Laws of Motion. At that time, and for many years thereafter, the solution of these equations was a tedious and time-consuming process that substantially detracted from the utility of the equations.[10] The development of computers capable of solving these equations and computer programs to express the plan for solving the equations in a form acceptable to the computer has not changed the nature of the underlying mathematical principles; nor has it changed the nature of the discovery into patentable subject matter. Such mathematical principles have been and should continue to be unpatentable. In the instant case it is equally evident that the mathematical technique which the respondents seek to patent is likewise independent of the application of this technique to a digital computer and therefore should not be patentable.

(2) In 1947, George Dantzig devised the Simplex Method for solving linear programming problems. This method provides a technique for handling large sets of linear equations. It is clearly and simply a mathematical technique for handling mathematical

[10] F. Moulton, New Methods in Exterior Ballistics (1926).

formulae, however, it has wide and diverse use in industry. For example, it can be used to determine the optimal operating conditions of large complex refineries or to determine the optimal assignment of crew members to aircraft that are flying on a wide array of schedules.[10] The basic discovery was first set out in a mathematical paper published within professional circles[11] and was then programmed for the SEAC computer, one of the first computers ever built. Had patent protection been available on the computer program, one of the most basic mathematical techniques in the use of computers would have fallen into restrictive private custody.

(3) In 1947 Von Neumann and Ulman discovered the Monte Carlo Technique in the course of theoretical work being done on the atomic and hydrogen bombs.[12] Using this technique, they generated large quantities of random numbers which simulated the behavior of sub-atomic particles. These random numbers were then handled according to statistical approximations rather than by rigid mathematical formulae. The Monte Carlo Technique has been widely published,[13] and it has become a standard method

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[10] A. Charnes & W. Cooper, Management Models and Industrial Applications of Linear Programming (1961).

[11] Dantzig, *Maximization of a Linear Function of Variables Subject to Linear Inequalities*, in Activity Analysis of Production and Allocation (T. Koopman ed. 1951).

[12] Richtmyer & Von Neumann, *Statistical Methods in Neutron Diffusion*, 5 Collected Works of John Von Neumann 751 (A. Taub ed. 1963).

[13] *E.g.*, McCracken, *The Monte Carlo Method*, 90 Scientific American 192 (May, 1955); Symposium on Monte Carlo Methods (H. Meyer ed. 1956) (incorporating 19 technical papers); J. Kelson, The Nature of the Monte Carlo Method, Cruft Laboratory Technical Report 127 (1951); Germond, *Summary of the*

for solving certain classes of partial differential equations. The Monte Carlo Technique is essential to the field of mathematical physics and many problems, such as those presented by the design of nuclear reactors, could not have been solved without its use.[53] This basic mathematical technique also has such diverse applications as developing insurance mortality tables and studying the growth of bacteria.[54] Theoretically the Monte Carlo Technique could be practiced using pencil and paper. However, since the number of calculations involved is generally very large, this method can realistically be practiced only with the aid of a computer. Like the Simplex Method discussed above, the Monte Carlo Technique was novel, useful, and expressed in the form of a computer program. Since its discovery no one has found a practical way to mathematically "invent around" it. Each alternative or extension for performing the same type of operations developed since the Monte Carlo Technique is its mathematical equivalent.

(4) In 1963, Fletcher and Powell developed a program for determining certain characteristics of geometrical surfaces. Given a mathematical expression involving several variables, the least and greatest values of the mathematical expression could be found using this method. In many applications, there is no practical alternative to using a computer for this type of work. The program was a significant

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Round Table Discussion at NBSINA Monte Carlo Symposium in NATIONAL BUREAU OF STANDARDS, THE MONTE CARLO METHOD (1951).

[53] *See* Ulman, *Computers*, 211 SCIENTIFIC AMERICAN 202, 205 (September, 1964).

[54] Walsh, *A Monte Carlo Technique for Obtaining Tests and Confidence Intervals for Insurance Mortality Rates* in SYMPOSIUM ON MONTE CARLO METHODS (B. Meyer ed. 1956); Roy, *On the Choice of a Mathematical Model to Represent Normal Bacterial Growth*, 13 STAT. SOC'Y BULL. 41 (1952).

improvement in the field and was immediately published and widely discussed.[16] It has found application in atomic energy research, physics research, and in economic and statistical research. It was the principal method of estimating parameters in certain types of problems for about five years and has spawned many improvements and extensions which have been the subject of intensive discussion at various professional meetings.

(5) In 1964, Bonner discovered a new technique for cluster analysis, improving upon original work done by Tryon in 1939.[17] Using this unquestionably novel and useful computer program, when a large number of items in a mathematical system can not be classified because of great randomness in their characteristics, the items can be divided into clusters; and the items in each cluster will have significant similarities. This technique provided an important mathematical breakthrough for medical work in analysis of patient symptoms. Subsequent improvements have been widely published and are widely used.[17]

(6) It is now evident that the uses of computer programming in advanced mathematics are not limited to working calculations from equations or formulae written by mathematicians. In the new field of symbolic computation, computer programming is used to actually formulate some of the equations needed as well as performing the computations to

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[16] Fletcher & Powell, *A Rapidly Convergent Descent Method for Minimization*, 6 COMPUTER JOURNAL 163 (1963); *see also*, Davidson, *Variable Metric Method for Minimization*, in Argonne National Laboratories publication 5990 (November, 1959).

[17] Bonner, *On Some Clustering Techniques*, 8 IBM JOURNAL OF RESEARCH AND DEVELOPMENT 22 (January, 1964); R. TRYON, CLUSTER ANALYSIS (1939).

[17] See, e.g., Siegel, Goldwyn & Friedman, *Pattern and Process in the Evaluation of Human SepticShock*, 70 SURGERY 232 (August, 1971).

solve the equations. For example, some integration problems in calculus are so extensive that the complications involved in writing the equations are too great for the mathematician to handle. With new breakthroughs in programming, the mathematician will be able to write the broad outlines of the problem and the computer will then both formulate the necessary equations and solve them.[35] These operations are both useful and necessary in the fields of celestial mechanics, relativity theory, physics, biochemistry and economics.

The few examples cited above are among many illustrations of pure mathematical discoveries expressed in computer programs. Any number of such examples could be found by examining the technical publications in this field. What is new and what is the product of inventive genius in each of these cases is the insight into or the mathematical expression of relationships within problems. Once the mathematical relationship is discovered, or as the mathematics are being worked out, any skilled programmer can do the operations necessary to create a computer program. The fact that the computer is a necessary tool with which the discovery is reached or used does not make the discovery any less an innovation in mathematics than did the use of such tools as the abacus, slide rule or adding machine affect the nature of mathematical discoveries in earlier times.

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[35] *See* 9 COMMUNICATIONS OF THE ACM 547 (August, 1966) (contains the proceedings of the ACM Symposium on Symbolic and Algebraic Manipulation, Washington, D.C., March, 1966, at which 24 papers were presented); Sammet, *Formula Manipulation by Computer*, 8 ADVANCES IN COMPUTERS 47 (F. Alt & M. Rubinoff eds. 1967); Sammet, *Software for Non-numerical Mathematics*, in MATHEMATICAL SOFTWARE at 295-330 (J. Rice ed. 1971); 14 COMMUNICATIONS OF THE ACM (August, 1971) (contains a selection of the 55 papers presented at the Second Symposium on Symbolic and Algebraic Manipulation, Los Angeles, California, March, 1971); Moses, *Symbolic Integration: The Stormy Decade*, 14 COMMUNICATIONS OF THE ACM 548 (August, 1971).

The few examples cited above are illustrative of the extensive exchange of information that has, in the past, characterized the mathematics field generally. Significant discoveries are quickly published in professional journals, and symposia are held regularly where contributors present their own work and critique the work of others. These examples also point out that once discoveries are published, there typically occurs a great volume of work dedicated to improvements and extensions of the principal discovery. Many symposia are dedicated almost exclusively to this function. This building and improving has paved the way for further major breakthroughs.

The stifling effect that patent protection would have on this field is evident. If the significant discoveries were patentable and were patented, no use could be made of the mathematical technique without the consent of the patentee. Moreover, the improvements that have characteristically taken place in this free unpatented field would be seriously restricted because other scientists and mathematicians would not be able to use the new idea or technique without a license.

II. COMPUTER PROGRAMS ARE NOT PATENTABLE SUBJECT MATTER.

Subsection A below analyzes the computer program from its origination by the programmer to the point where it is utilized by the machine. Subsection B below analyzes the actual operation of the computer in response to the electrical impulses generated at the direction of the program. Amicus curiae submits it is manifest that in neither respect is a computer program patentable subject matter.

A. A Computer Program Is a Mode of Expression of Ideas and as Such Is Not Patentable Subject Matter.

The language used to describe computers and computer programs is often highly technical and complex. There-

fore it is essential to take a common-sense approach when evaluating computer programs. It is readily apparent that modern computers have enormous potential. They are ready to receive and store millions of units of information, to make hundreds of thousands of comparisons or calculations per second, and to report the results of work done. All of these functions are performed in response to electrical impulses in various combinations. The source of electricity and the physical means of generating the necessary electrical impulses are part of the computer itself. The sequence in which the electrical impulses are generated is directed by the computer program.

A computer programmer changes the mode of expression of ideas or information from a language like English to directions which can be utilized by the computer. The mode of expression that is the computer program encompasses all the work from the conception of the plan or idea through the ones and zeroes on magnetic tape. This work may be done in several steps. A flow chart may be constructed entirely in English but using standard diagramming techniques. This sets out a basic plan. The plan may then be broken down into many detailed instructions set out in a special language such as Fortran [*] that is both a shorthand for and more precise than English. From this point, the remaining translation work is generally done automatically. A keypunch machine changes the written Fortran instructions (typed out by the operator) into punched cards and the computer, operating in response to a compiler program, changes the punched cards into a series of binary representations which can be used directly by the computer. Each of these steps and any combina-

[*] Fortran is a shortened form of Formula Translation. Other programming languages include COBOL (Common Business Oriented Language), ALGOL (Algorithmic Language) and PL/I (Programming Language I).

tion of them is a writing done for the purpose of expressing ideas or information.

Conceding, then, the necessity for programs and the circumstance that their development may require considerable effort, this does not establish that they are patentable subject matter any more than one can derive patentable subject matter from the manuscripts which are the workstuff of printing presses or the photographic subjects without which cameras would be useless. An idea or plan of action translated into computer language is no more patentable than the same idea or plan of action translated or transformed into Chinese poetry. The aura of complex machinery and high-speed electronic wizardry evoked by the descriptions of computer operations does not change the basic nature of the computer program into patentable work product.

This Court has long classified discoveries of a principle, idea, plan, technique or any other abstraction as unpatentable. The purpose of this general classification was to restrict the monopolies granted under the patent statute to the limits intended by Congress and consistent with the Constitutional standard of promoting progress in science and the useful arts. U.S. CONST. art. I, § 8, cl. 8. In *Burr* v. *Duryee*, 68 U.S. (1 Wall.) 531, 570 (1864) the Court plainly stated: "We find here [in the patent act] no authority to grant a patent for a 'principle' or a 'mode of operation,' or an *idea*, or any other abstraction." *See also LeRoy* v. *Tatham*, 55 U.S. (14 How.) 155, 174 (1852); *Fuller* v. *Yentzer*, 94 U.S. (4 Otto) 288 (1877); *Tilghman* v. *Proctor*, 102 U.S. (12 Otto) 707, 724-26 (1880); *Mackay Radio & Telegraph Co.* v. *Radio Corp. of America*, 306 U.S. 86, 94 (1939); *cf. DeForest Radio Co.* v. *General Electric Co.*, 283 U.S. 664 (1931).

More recently, in *Funk Brothers Seed Co.* v. *Kalo Inoculant Co.*, 333 U.S. 127 (1948), this Court reiterated (in the context of a product claim) the basic rule against patenting a principle or law of nature, and

emphasized that in no case can invention be borrowed from the principle or idea *per se*. In *Funk Brothers* the patent holder had used known techniques to experiment with various strains of bacteria that were used in connection with fertilizing crops. He had the idea that several strains of bacteria might be found compatible and therefore could be used together. This would eliminate the need for several independent applications to crops of individual strains of bacteria. The patent holder's experimentation was successful and he was able to package combinations of these bacteria. It was conceded that this product was new, useful, and more efficient than its predecessors. However, the Court held that the discovery was the principle of nature that certain strains of bacteria are compatible. The method of packaging the bacteria was a simple step once it was known that certain strains were indeed compatible.

> ". . . [O]nce nature's secret of the non-inhibitive quality of certain strains of the species of Rhizobium was discovered, the state of the art made the production of a mixed inoculant a simple step. Even though it may have been the product of skill, it certainly was not the product of invention. There is no way in which we could call it such unless we borrowed invention from the discovery of the natural principle itself. That is to say, there is no invention here unless the discovery that certain strains of the several species of these bacteria are non-inhibitive and may thus be safely mixed is invention. But we cannot so hold without allowing a patent to issue on one of the ancient secrets of nature now disclosed. All that remains, therefore, are advantages of the mixed inoculants themselves. They are not enough." 333 U.S. at 132.

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[30] The requirement that invention must reside solely in the practical application of an idea or principle is a complete answer to the argument that "computer logic operations can be performed either with wired circuitry or programming" and that since the wired circuitry is patentable the programs should be also. *See* Brief for

See also Armour Pharmaceutical Co. v. *Richardson-Merrell, Inc.*, 396 F.2d 70 (3d Cir. 1968); *Davison Chemical Corp.* v. *Joliet Chemicals, Inc.*, 179 F.2d 793 (7th Cir. 1950); *cf. Templeton Patents, Ltd.* v. *J. R. Simplot Co.*, 336 F.2d 261 (9th Cir. 1964).

This case is remarkably parallel to the *Funk Brothers* case. What respondents discovered was a principle of mathematics—that the conversion from binary coded decimal to binary could be accomplished by a specified operation of binary addition. Once that was discovered, the method of packaging—the computer program—was a simple step from known programming technology. Since, under the holding of *Funk Brothers*, the discovery of the mathematical principle cannot be a basis for patentability, the basis must arise out of the "packaging" of that principle or patent protection is not available. Clearly, the simple computer program set out by respondents' application is of no greater inventive dignity than the packaging held unpatentable in *Funk Brothers*. Further, amicus curiae contends that the nature of computer programs is such that whatever invention is present will always reside in the principle or idea and that the "packaging" or the mode of expression that makes the computer program machine-readable will be obvious once the principle or idea is disclosed.

B. The Performance of Operations Pursuant to the Instructions Contained in a Program Is the Inherent Function of the Computer and as Such Is Not Patentable Subject Matter.

As described above, the development of a computer program to the point where machine-readable instruc-

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Respondents in Opposition, at 4. This argument overlooks the fact that the underlying mathematical principles cannot lend patentability either to wired circuitry or to a computer program. Wired circuitry may be patentable, but only if invention is found to reside solely in some feature of the wiring.

tions are available and the computer is ready to function is essentially a writing and translation process. But respondents claim that their invention includes more than just the development of the program. It includes the "machine method for converting signals encoded in the binary coded decimal (BCD) notation into signals encoded in the ordinary binary notation." And further ". . . respondents' claims are directed to a particular sequence of machine steps, designed to accomplish a particular result." Brief for Respondents in Opposition, at 1, 3. Respondents claim that the functioning of the computer in carrying out the computer program is itself a patentable process.

However, it is clear that in carrying out the instructions in respondents' program the computer operates entirely as it was designed and intended to operate. Each individual storing, shifting, masking, and adding operation specified by respondents' application is an operation of which the computer is capable entirely apart from any specific instructions. The only contribution of the instructions is to set out a specific sequence of these storing, shifting and other operations to achieve a desired result. Varying the sequence of these operations clearly does not vary the actual nature of the operation in any way from that originally intended by the designer of the computer. There is no suggestion anywhere that claim 8 involves anything other than the most routine application of an elementary computer program to old conventional computers including a "shift register." Indeed, the record is clear that such is the case. Respondents stated to the court below that, "all of the recited signal manipulations are conventional operations which are performed by conventional electronic apparatus." Brief for Appellants before the Court of Customs and Patent Appeals, at 9.

It is well settled that the functioning of a machine, as it was designed and intended to function, is not patent-

able as a process. In the very early case of *Corning* v. *Burden*, 56 U.S. (15 How.) 252 (1853), this Court made this distinction with respect to the definition of a process.

> "It is when the term process is used to represent the means or method of producing a result that it is patentable, and it will include all methods or means which are not effected by mechanism or mechanical combinations. But the term process is often used in a more vague sense, in which it cannot be the subject of a patent. Thus we say that a board is undergoing the process of being planed, grain of being ground, iron of being hammered, or rolled. Here the term is used subjectively or passively as applied to the material operated on, and not to the method or mode of producing that operation, which is by mechanical means, or the use of a machine, as distinguished from a process. In this use of the term it represents the function of a machine, or the effect produced by it on the material subjected to the action of the machine. But it is well settled that a man cannot have a patent for the function or abstract effect of a machine, but only for the machine which produces it." 56 U.S. at 268.

The rule that a function of a machine is unpatentable was reiterated *inter alia* in *Risdon Iron & Locomotive Works* v. *Medart*, 158 U.S. 68, 77 (1895); *Westinghouse* v. *Boyden Power Brake Co.*, 170 U.S. 537, 554-57 (1898); *Expanded Metal Co.* v. *Bradford*, 214 U.S. 366, 383 (1909), and has never been compromised in this Court.[31]

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[31] This reason for rejection of respondents' patent application was raised by the examiner, Record at 18, 29, but was not argued by the Patent Office because this doctrine has been expressly repudiated by the court below. In *Application of Tarczy-Hornoch*, 397 F.2d 856 (C.C.P.A. 1968), it was summarily dismissed as "the product of an essentially illogical distinction unwarranted by, and at odds with, the basic purposes of the patent system and productive of a range of undesirable results from the harshly inequitable to the silly." 397 F.2d at 867.

III. THE PRACTICE IN OTHER COUNTRIES IS TO DENY PATENT PROTECTION FOR COMPUTER PROGRAMS.

The question of the patentability of advances in computer programming has been raised in at least ten other countries, either with respect to specific legislative proposals, or decisions under existing law as to applications for patents on computer programs. The specific provisions of law with respect to patent protection in these countries vary in differing degrees from those in force in the United States. However the basic policy question with respect to the patentability of computer programs is essentially the same within each of these systems of patent law. Each must face the question of the essential nature of a computer program and the effect that patents issued on computer programs would have on the patent system and the public interest. Most countries have resolved the policy problem by refusing to grant patent protection for computer programs.

In France there is a recently enacted direct statutory prohibition on patents for computer programs.[*] The United Kingdom currently has no such direct statutory prohibition, and the applicable law with respect to computer programs apart from hardware is unclear, but the government's Committee to Examine the Patent System

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[*] Article 7 of the French Patent Law provides:

"Any invention is considered industrial which in its object, its application and its result, whether achieved by human intervention or by machine, cooperates in the production of goods or technical results. Not considered as industrial inventions, are, in particular: (1) Theoretical, or purely scientific principles, discoveries or concepts; . . . (3) Financial or accounting methods, rules or games, or all other systems of an abstract character and, in particular, the programs or series of instructions used for promoting the operation of a computer." Patent Law of January 2, 1968, art. 7 (An English translation appears in INDUSTRIAL PROPERTY 67-75 (BIRPI, Geneva, Switz., March, 1968).

and Patent Law last year strongly recommended adoption of a statutory prohibition.[44] The Japanese Patent Office has a regular practice of rejecting patent applications directed to computer programs.[45]

In Australia,[46] Austria,[47] Denmark,[48] The Nether-

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[44] The Committee's report devoted a full chapter to the protection of computer programs and stated:

> "a computer program that is: a set of instructions for controlling the sequence of operations of a data processing system, in whatever form the invention is presented e.g. a method of programming computers, a computer when programmed in a certain way and where the novelty or alleged novelty lies only in the program; should not be patentable." The British Patent System, Report of the Committee to Examine the Patent System and Patent Law, Cmnd. No. 4407, at 144 (July, 1970).

[45] Matsuiye, Protection of Software by Patent Law, Present Status and Argument §2(b), report submitted to Committee for Legal Study of Software Protection, Ministry of International Trade and Industry (July 2, 1971).

[46] Australia: In three cases appealed from rejections by the examiners, the Australian Patent Office has uniformly held program inventions to be not patentable. *N. V. Philips*, 36 Official Journal of Patents, Trademarks and Designs 2392 (1966); *Application of Texas Instruments*, 38 Official Journal of Patents, Trademarks and Designs 2846 (1968); *Application of British Petroleum, Ltd.*, 38 Official Journal of Patents, Trademarks and Designs 1020 (1968).

[47] Austria: The Appeal Senate of the Austrian Patent Office recently held that computer programs are not patentable, B332/70 (A125/67), October 29, 1970, and stated:

> "Protection extending solely to computing rules is not practicable, for . . . scientific rules and principles as such were expressly excluded from patent protection."

See also nullity proceeding against Austrian Patent No. 23,978 owned by the British Petroleum Company, Ltd., 11 Patent Gazette 186 (1968).

[48] Denmark: The Appeal Department of the Danish Patent Office decided a case involving a patent application on a computer program for the first time last year. The Danish Application Department rejected the application on the ground that the invention constituted a programming algorithm and was, therefore, not statutory subject matter. This rejection was affirmed by the Appeal Department. *Application of Telefonaktiebolaget L M Ericsson*, Danish Patent Application No. 1157-69.

lands,[**] and Switzerland,[**] Patent Office appellate proceedings have resulted in decisions declaring that computer programs are *not* patentable subject matter.

Although the question is not settled in Germany, a recent commentary would make it appear that programs are *not* patentable in Germany.[**] The German Patent Office has rejected a patent application on the same invention as is at issue in this case. *Application of Benson*

[**] *Netherlands:* A recent decision of the Patent Office Board of Appeals, on December 16, 1970, held that computer programs are not patentable under the Netherlands Patent Act and stated:

> "The programming of the device according to the invention, the so-called software, is, indeed, founded on a meritorious idea, but the implementation thereof is unpatentable either as a device or as a process." BIE No. 2 (February 15, 1971).

[**] *Switzerland:* Computer programming inventions are currently considered unpatentable in Switzerland as the result of a Swiss Patent Office decision of September 2, 1968 rejecting an application with claims to a computer program. The application related to a procedure for the design of construction reinforcements by programming the calculation for design on a known computer. In reaching its decision the Patent Office stated that the design of a computer program is not an achievement which uses the means of natural forces or which influences natural forces to achieve a "technical result" but rather a purely mental effort for which patent protection is not available. Patent Muster Und Markenblatt 68-1-68.

[**] *Germany:* KRAUSSE, KAUFMANN, & LINDENMAIER, DAS PATENTGESETZ (The Patent Act) at 9 (8th ed. 1970) states:

> "In accordance with the opinion generally advanced in German literature, programs for controlling electrical data processors are not patentable. Such processors operate to a program consisting of a sequence of instructions relating to the actual intellectual achievement. Programs do not solve circuit problems but are dependent upon a particular algorithm. . . . The input of the program, that means its storage, which is effected by means of paper, tapes, punched cards or magnetic tapes, does not alter the fact that the program is merely an instruction for operating the machine, by means of which the stored material is to be checked and processed. It does not constitute, however, a teaching for technical action.

and Tabbot, German Patent Application No. P 1474091.1-53, and an appeal is pending.

The question is also unsettled in Canada. Early in 1971 the Economic Council of Canada, which had studied the patent system and formulated patent policy recommendations, stated: "We conclude, therefore, that patent protection of computer programs would not be appropriate in Canada at the present time." Economic Council of Canada, REPORT ON INTELLECTUAL AND INDUSTRIAL PROPERTY at 103 (January, 1971). The Canadian Patent Office then issued administrative instructions that computer programs were not to be considered patentable subject matter.[a] In December, 1971, however, the Commissioner of Patents decided that "a computer that is programmed in one way is a machine which is different from the same computer programmed another way" and held that some forms of computer programs are patentable. *Application of Waldbaum*, 100 Patent Office Record, p. vii, (No. 3) (January 18, 1972); BNA PATENT TRADEMARK AND COPYRIGHT JOURNAL, p. D-1 (December 23, 1971). In support of his decision the Commissioner cited three cases decided by the United States Court of Customs and Patent Appeals that are in the line of cases preceding and leading to the case at bar. *Application of Prater*, 415 F.2d 1393 (C.C.P.A. 1969); *Application of Bernhart*, 417 F.2d 1395 (C.C.P.A. 1969); *Application of Musgrave*, 431 F.2d 882 (C.C.P.A. 1970). The result in each of these C.C.P.A. decisions is erroneous for the same reasons that the result in the case before this Court is erroneous. The Canadian Commissioner's decision is, therefore, little additional support for the proposition that computer programs are patentable, particularly in light of the opposite position taken by eight other countries.

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[a] The Patent and Trademark Institute of Canada, Newsletter, No. 86 (August 9, 1971).

IV. APPROPRIATE PROTECTION FOR PROPRIETARY INTERESTS IN COMPUTER PROGRAMS IS AVAILABLE THROUGH COPYRIGHT AND ANY NEW FORM OF PROTECTION FOR COMPUTER PROGRAMS SHOULD BE ACCOMPLISHED BY LEGISLATION AND NOT BY JUDICIAL EXPANSION OF THE PRESENT PATENT SYSTEM.

A. Copyright Is an Appropriate Form of Protection for Proprietary Interests in Computer Programs.

Computer programs have been accepted for copyright registration since 1964. The copyright statute, 17 U.S.C. § 1 *et seq.*, makes no reference to computer programs, but the Copyright Office has decided that computer programs are covered by the general provisions of the statute because they are readable, they have authors, and they are writings.[a]

Computer programming is a very flexible art. Given a single problem and a basic plan for its solution, two different programmers could, and likely would, write two different computer programs to put the instructions for the solution into a form acceptable to a computer. The principal merit of copyright protection is that it would protect only against the copying of the expression of the idea, that is the computer program as worked out by the programmer. It would not extend to the "idea" behind the program; that is the algorithm or basic plan for the solution of the problem.[a]

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[a] Copyright Office, *Announcement*, 11 BULL. COPYRIGHT SOC'Y 261 (1964); *see also* Nelson, *The Copyrightability of Computer Programs*, 7 ARIZ. L. REV. 204 (1966); *Note, Copyright Protection for Computer Programs*, 64 COLUM. L. REV. 1274 (1964).

[a] As this Court held in *Baker* v. *Selden*, 101 U.S. (11 Otto) 99, 103 (1880):

"The copyright of a work on mathematical science cannot give to the author an exclusive right to the methods of opera-

The creation of complex and sophisticated computer programs typically costs many thousands of dollars.[44] Most, perhaps as much as 90%, of this cost is incurred in the very time-consuming job of transforming the basic plan or set of steps for solution of the problem (the algorithm or the "idea") into a finished product in programming or machine language. Therefore the need for protection against copying is very real. Copyright achieves the basic purpose of preventing one who has made no investment of time or money in creating a computer program from appropriating the program by copying it. However, it does not prevent the legitimate creator of computer programs from independently arriving at the same overall result by making his own investment of the required time and effort. Thus the owner's efforts are secured without the accompanying effect of stifling further development of the idea or of the field.

B. New Forms of Protection for Computer Programs Are Being Formulated and Considered by Congress.

Amicus curiae does not contend that the proprietary interests in computer programs should be without protection beyond copyright.[45] Indeed, in the long run,

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tion which he propounds, or to the diagrams which he employs to explain them, so as to prevent an engineer from using them whenever occasion requires. The very object of publishing a book on science or the useful arts is to communicate to the world the useful knowledge it contains."

See also M. NIMMER, COPYRIGHT § 37.2 (1971); *accord*, *Mazer* v. *Stein*, 347 U.S. 201, 217 (1954).

[44] One example cited is that a program that cost $250,000 to produce could be copied for as little as $50. Reynolds, *Software Protection and Software Sale*, 9 DATA PROCESSING MAGAZINE 50 (May, 1967).

[45] Trade secret protection is already available for those who desire to restrict knowledge of the computer program to a selected

the maintenance of the necessary incentives to development of new program ideas may well require some limited form of protection against unauthorized copying or use that goes beyond present copyright law. Amicus curiae does contend, however, that the current patent statute is an inappropriate means of protection, which cannot and should not be extended by judicial decision to meet this need.

It is significant that general revision of the patent laws has been under active consideration by the Congress since the report of the President's Commission on the Patent System was issued in 1966[46] and the question of the patentability of computer programs has been reviewed in this context. Moreover, several proposals have been made for legislation to create a special and limited form of protection, somewhere between copyright and patent, tailored to the computer programming industry and its dependence on ready access to new pro-

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few. However, trade secret protection would not extend to a program that was widely sold or circulated. *See generally* R. MILGRIM, TRADE SECRETS § 2.09[5] (1972).

[46] Nine bills were introduced during the 90th Congress: S. 1042, 90th Cong., 1st Sess. (1967); S. 1691, 90th Cong. 1st Sess. (1967); S. 2164, 90th Cong., 1st Sess. (1967); S. 2597, 90th Cong., 1st Sess. (1967); S. 3892, 90th Cong., 2d Sess. (1968); H.R. 5924, 90th Cong., 1st Sess. (1967); H.R. 7454, 90th Cong., 1st Sess. (1967); H.R. 10006, 90th Cong., 1st Sess. (1967); H.R. 11447, 90th Cong., 1st Sess. (1967).

Four bills were introduced during the 91st Congress: S. 1246, 91st Cong., 1st Sess. (1969); S. 1469, 91st Cong., 1st Sess. (1969); S. 2756, 91st Cong., 2d Sess. (1970); H.R. 12280, 91st Cong., 1st Sess. (1969).

Two of the bills introduced in the 90th and 91st Congresses were reintroduced in the 92d Congress. S. 643, 92d Cong., 1st Sess. (1971); H.R. 4012, 92d Cong., 1st Sess. (1971). Hearings were held on S. 643 on May 11, 1971. CCH Congressional Index, 92d Congress, p. 2506 (1972).

gram concepts."[47] Whatever additional forms of protection are to be extended to computer programs should be decided by Congress, after full consideration of the impact that such protection would have on this new and flourishing field.

[47] *See generally*, Morris, *Protecting Proprietary Rights of Computer Programs: The Need for New Legislative Protection*, 21 CATH. U. L. REV. 181 (1971); Goldberg, *Legal Protection of EDP Software*, 18 DATAMATION 66 (May, 1972); R. Brown, Property Rights Under the New Technology, Hopkins-Brookings Lecture Series, The Brookings Institution, Washington, D.C. (February 12, 1970); Galbi, *Proposal for New Legislation to Protect Computer Programming*, 17 BULL COPYRIGHT SOC'Y 280 (April, 1970) (IBM proposal); Comment, *Computer Program Protection: The Need To Legislate a Solution*, 54 CORNELL L. REV. 586 (1969).

CONCLUSION

The decision of the Court of Customs and Patent Appeals should be reversed.

Respectfully submitted,

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